

DESIGN SUMMARY

LAKE TIPPECANOE

HANNA B. WALKER DRAIN SEDIMENT TRAP

February, 2000

Prepared for:

Tippecanoe Environmental Lake and Watershed Foundation

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DESIGN SUMMARY

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EXECUTIVE SUMMARY

The proposed project involved the construction of one sediment trap on Hanna B. Walker Drain, a tributary of Lake Tippecanoe. The trap is designed to reduce the sediment flux from the Hanna B. Walker Drain into the lake. The proposed project is a stop-gap measure to intercept heavy sediment loads while more permanent solutions upstream can be addressed. The construction spoils were deposited into an existing, approved dual-stage sediment basin located 400 feet north of the project area.

The trap was designed to collect up to 50% of the suspended solids and 100% of the bed load. The trap is bordered on the east and on the upstream end by a PVC sheet pile wall designed to protect the adjacent concrete seawall and ease future cleaning out of the trap. The area between the sheet pile and seawall was backfilled and protected with coconut fiber erosion control matting and fiberlogs vegetated with wetland plants. Prairie seeding of adjacent Nature Conservancy/YMCA Camp Crosley property occurred on an access area north of the sediment trap, as per an agreement with The Nature Conservancy.

SECTION I. PROJECT DESCRIPTION AND PURPOSE

The proposed project involved the construction of one sediment trap on Hanna B. Walker Drain, a tributary of Lake Tippecanoe. The trap was designed to reduce the sediment flux from the Hanna B. Walker Drain into the lake.

As identified within the previous study titled “Lake Tippecanoe Diagnostic Study,” Hanna B. Walker Drain is the source of the high nutrient and sediment load to Lake Tippecanoe. The deposited sediment is creating sediment bars and dense European water milfoil beds at and beyond the mouth of this drain. The proposed project is a stop-gap measure utilizing a relatively inexpensive sediment trap, while more permanent solutions are addressed in the watershed.

The trap also serves to collect sediment created during any future restoration activities. Ultimately, it is anticipated that this trap will become unnecessary. However, without this temporary provision, many tons of sediment will flow to the lake annually, with even higher sediment levels delivered to the lake during upstream restoration activities.

SECTION II. PROJECT DESIGN DETAILS

The sediment trap is approximately 20 feet wide by 75 feet long by 6 feet deep. The trap is designed to collect up to 50% of the suspended solids and 100% of the bed load. The trap is bound on two sides by a PVC sheet pile wall. The wall along the east bank of the drain is to keep the east concrete seawall from collapsing and is driven from 6-10 feet below the surface of the water. The sheet pile along the upstream edge of the sediment trap will insure s integrity of the trap while preventing a headcut from forming within the Hanna B. Walker Drain. The PVC wall is anchored with cable and deadman or anchor bolts into the existing concrete wall every eight feet.

The area between the sheet pile and seawall is filled with sand, covered with coconut fiber matting, bordered by biologs and vegetated with wetland plants. Additional prairie planting shall occur to the north of the sediment trap, as per an agreement with The Nature Conservancy and YMCA Camp Crosley. All agreements and permits necessary for this project are attached in Appendix A.

The basin was excavated using a barge mounted hydraulic dredge with the material being pumped to an existing approved disposal basin 400 feet upstream. The sizing calculations for the sediment trap are included within Appendix B. No unusual problems were noted during dredging as this same area had been dredged several previous times.

SECTION III. DESIGN SPECIFICATIONS

The following specifications shall be used during construction to ensure project is built to the purpose and intent of the original design:

A. Sediment Trap Excavation

Sediment trap excavation shall be done by hydraulic dredging with a floating dredge so as to avoid unnecessary disturbance to adjacent property. Hydraulic dredging shall be performed by an experienced dredge operator familiar with the site. The sediment trap shall be excavated to the lines and grades as shown on the construction drawings. The spoils shall be deposited into an existing, approved dual-stage sediment basin located 400 feet north of the project area.

B. Sheet Pile

Sheet pile shall be used to form the eastern and northern boundaries of the sediment trap. Sheet pile shall be PVC sheet pile as manufactured by C-Loc. PVC sheet pile shall have a minimum yield strength of 6,350 psi (tensile) and flex strength of 8,600 psi (bending). PVC sheet pile shall be UV stabilized. Sheet pile shall be driven with an excavator or vibrator in the locations shown on the construction drawings. Sheet pile shall be driven one to three feet lakeward of the concrete seawall to a depth of 6-10 feet with the tops of the wall remaining just below the normal waterline. Anchors shall be used to secure the sheet pile to the bank. Anchors shall be model RAL 20/47 anchors as manufactured by Royal Anchor Systems, Inc. or approved equal. Anchors shall be placed on ten foot centers or less. The area between the sheet pile and seawall shall be filled with ungraded fill material.

C. Biologs and Seeding

Biologs shall be placed between the sheet pile and seawall and cover the sheet pile. The biologs will be vegetated on site with bur reed (*Sparganium* sp.), yellow iris (*Iris pseudacorus*), blue flag (*Iris virginica*), pickerel weed (*Pontederia cordata*), arrow arum (*Peltandra virginica*), and sweet flag (*Acorus calamus*). Biologs shall be installed in the spring of 2000 to provide a full growing season for plant establishment and survivability. Any area disturbed on the owner's property will be reseeded/resodded at the owner's discretion. Additionally, a 40 foot by 130 foot area adjacent to the owner's north property boundary shall be seeded with an appropriate prairie mix as per the agreement with The Nature Conservancy and YMCA Camp Crosley.

SECTION IV. CONSTRUCTION TASK AND TIMETABLE

The following tasks shall be performed during construction and by the dates shown:

<u>Task</u>	<u>Date</u>
1. Excavate Sediment Trap	Fall 1999
2. Drive Sheet Pile	Fall 1999
3. Install Anchors	Spring 2000
4. Fill Behind Sheet Pile	Spring 2000
5. Install Biologs	Spring 2000
6. Seeding and Site Clean-up	Spring 2000
7. Project Complete	Spring 2000

SECTION V. MAINTENANCE ACTIVITIES

The following maintenance activities shall be performed by the Lake Association:

<u>Frequency</u>	<u>Task</u>
Annually	Visually inspect sheet pile for damage. Repair as necessary.
Annually	Visually inspect biologs and prairie area. Replant as necessary.
Annually	Measure sediment depth within trap.
As Needed	Excavate sediment when trap is more than 60% full.

The dredge spoils should be removed to a permanent disposal site. Proper permits should be obtained prior to any excavation activity. As of the date of this document, no additional permits are required to maintain the sediment trap. Maintenance is a condition of the permits.

SECTION VI. PROJECT CONCLUSIONS

The overall project purpose is to capture sediment which would otherwise be deposited within Lake Tippecanoe. On this level the project will be successful. This project, however, is a short term solution which helps reduce sediment but does not address the overall cause of sedimentation from tributaries to Lake Tippecanoe. For the project to be completely successful nutrients from the dairy farm and erosion from agricultural fields and the stream banks must be accomplished.

APPENDIX A

PROJECT PERMITS

APPENDIX B

SEDIMENT TRAP SIZING

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